

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-27 (Cancel)

28. (New) A method for producing a cyclohexene derivative product library comprising contacting a mixture of first reactants each coupled to a member of a nucleic acid test mixture with a mixture of free reactants, wherein:

each said first reactant is a dienophile and each said free reactant is a diene, or

each said first reactant is a diene and each said free reactant is a dienophile;

and

wherein said product library is formed as a result of a Diels-Alder bond formation reaction between said first reactants and at least one of said free reactants, wherein said Diels-Alder bond formation reaction is facilitated by the nucleic acid coupled to said first reactant.

29. (New) The method of claim 28 wherein a linker group is coupled between each said first reactant and said nucleic acid.

30. (New) The method of claim 29 wherein said linker group has a size in the range of 10 to 1000 Å.

31. (New) The method of claim 30 wherein said linker group is selected from the group consisting of PEG, polyvinyl alcohol, polyacrylates and polypeptides.

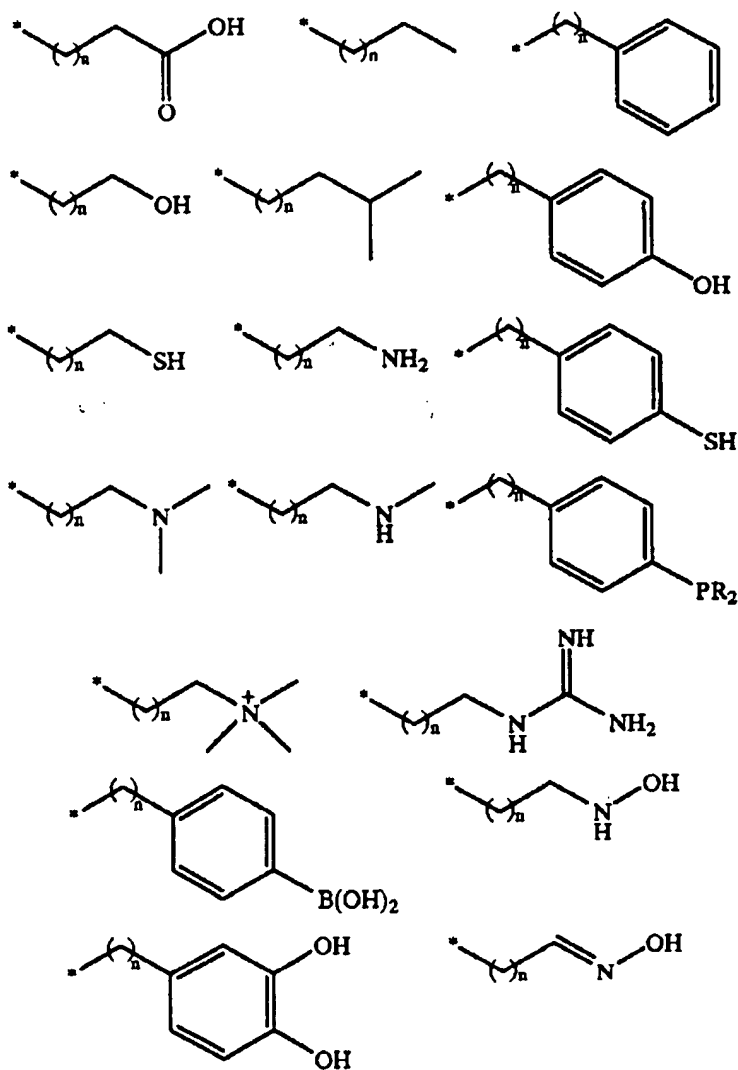
32. (New) The method of claim 28 wherein said nucleic acid test mixture comprises nucleic acids each having a region of conserved sequences and a region of randomized sequences.

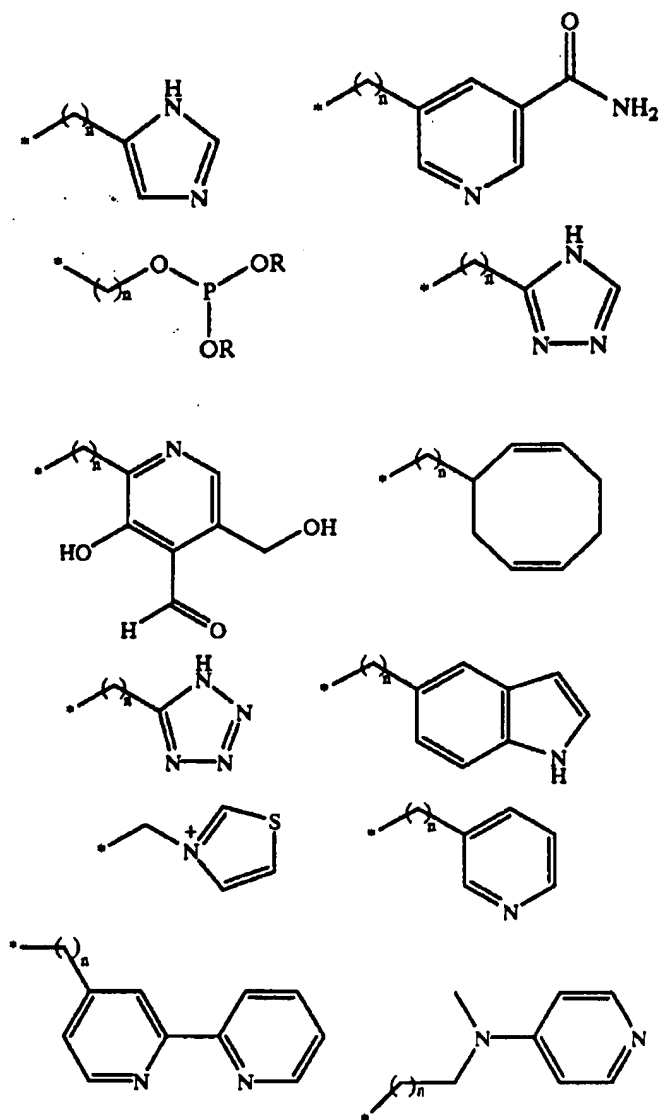
33. (New) The method of claim 28 wherein each member of said nucleic acid test mixture is selected from the group consisting of single-stranded RNA, single-stranded DNA, and double-stranded DNA.

34. (New) The method of claim 28 wherein each said first reactant is a diene and each said free reactant is a dienophile.

35. (New) The method of claim 28 wherein each said first reactant is a dienophile and each said free reactant is a diene.

36. (New) The method of claim 28 wherein said nucleic acid test mixture comprises nucleic acids having one or more functional groups selected from the group consisting of





wherein the asterisk indicates the point of attachment of the chemical group to the nucleic acid, n may be any integer and wherein said chemical groups may be substituted at aliphatic or aromatic positions.

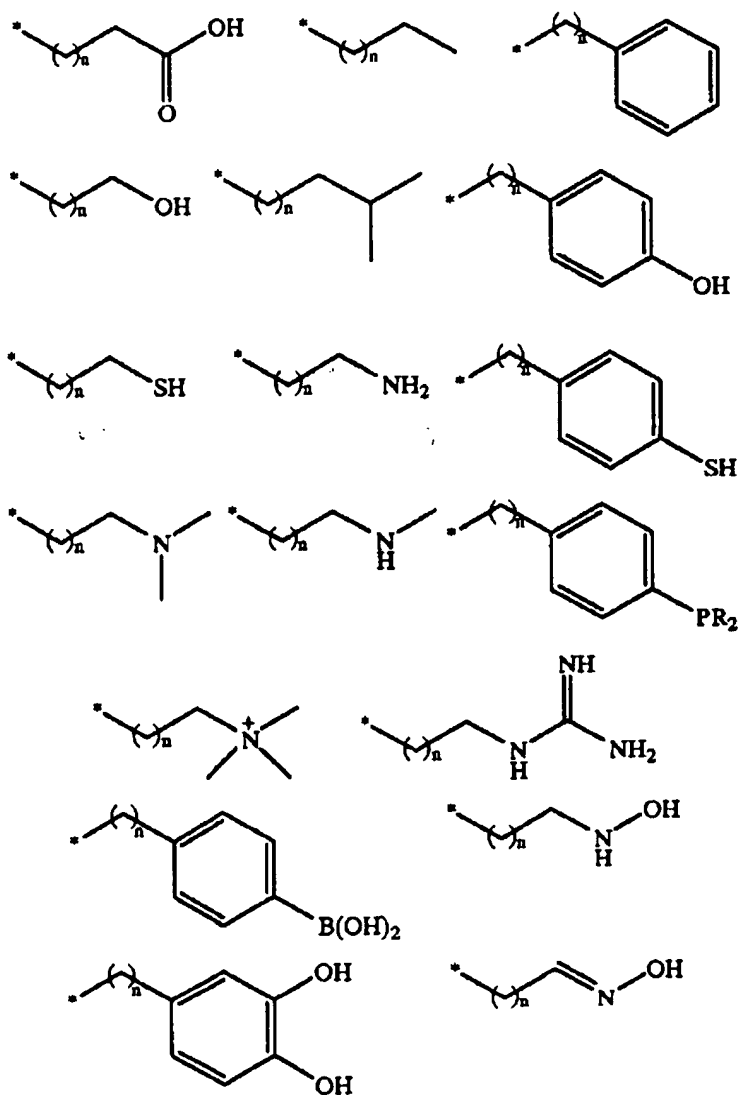
37. (New) The method of claim 36 wherein said functional group is on a ribose position of said nucleic acid.

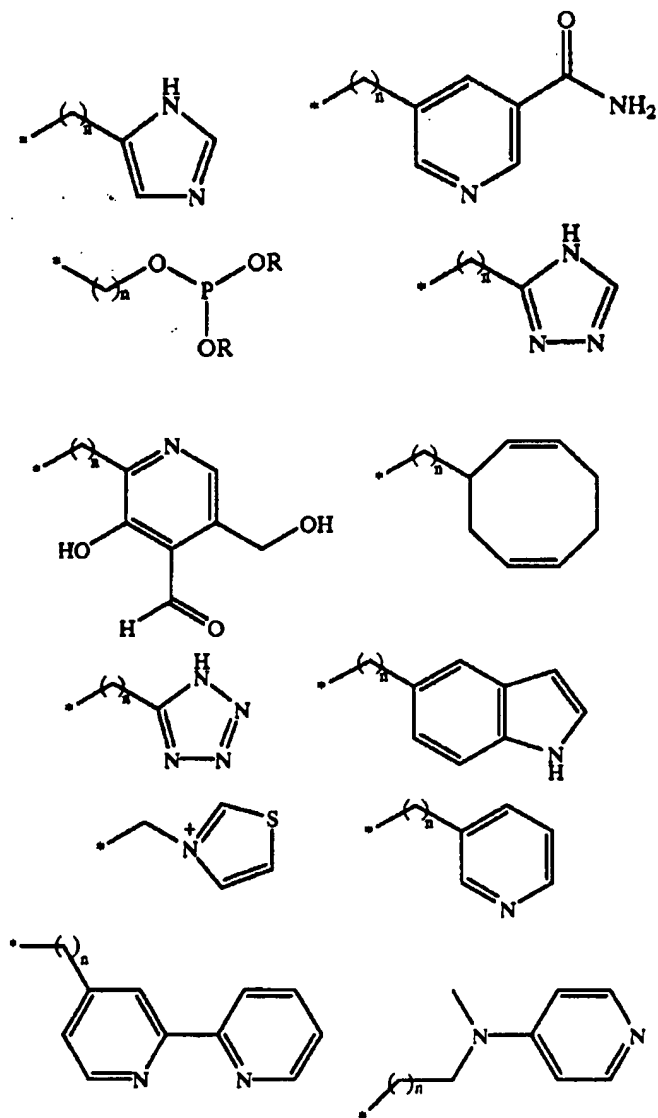
38. (New) The method of claim 36 wherein said functional group is on a base position of said nucleic acid.
39. (New) The method of claim 36 wherein said functional group is on a phosphate position of said nucleic acid.
40. (New) A cyclohexene derivative product library produced by a method comprising contacting a mixture of first reactants each coupled to a member of a nucleic acid test mixture with a mixture of free reactants, wherein:
- each said first reactant is a dienophile and each said free reactant is a diene, or
  - each said first reactant is a diene and each said free reactant is a dienophile; and
  - wherein said product library is formed as a result of a Diels-Alder bond formation reaction between said first reactants and at least one of said free reactants, wherein said Diels-Alder bond formation reaction is facilitated by the nucleic acid coupled to said first reactant.
41. (New) The product library of claim 40 wherein a linker group is coupled between each said first reactant and said nucleic acid.
42. (New) The product library of claim 41 wherein said linker group has a size in the range of 10 to 1000 Å.
43. (New) The product library of claim 42 wherein said linker group is selected from the group consisting of PEG, polyvinyl alcohol, polyacrylates and polypeptides.
44. (New) The product library of claim 40 wherein said nucleic acid test mixture comprises nucleic acids each having a region of conserved sequences and a region of randomized sequences.
45. (New) The product library of claim 40 wherein each member of said nucleic acid test mixture is selected from the group consisting of single-stranded RNA, single-stranded DNA, and double-stranded DNA.

46. (New) The method of claim 40 wherein each said first reactant is a diene and each said free reactant is a dienophile.

47. (New) The method of claim 40 wherein each said first reactant is a dienophile and each said free reactant is a diene.

48. (New) The product library of claim 40 wherein said nucleic acid test mixture comprises nucleic acids having one or more functional groups selected from the group consisting of





wherein the asterisk indicates the point of attachment of the chemical group to the nucleic acid,  $n$  may be any integer and wherein said chemical groups may be substituted at aliphatic or aromatic positions.

49. (New) The product library of claim 48 wherein said functional group is on a ribose position of said nucleic acid.

50. (New) The product library of claim 48 wherein said functional group is on a base position of said nucleic acid.

51. (New) The product library of claim 48 wherein said functional group is on a phosphate position of said nucleic acid.

52. (New) A product library comprising a plurality of cyclohexene derivatives, wherein each cyclohexene derivative is coupled via a linker to a nucleic acid comprising a region of randomized sequence flanked by regions of conserved sequences.